

ammonia and of potass were found by the author not to correspond with any of the preceding. Although agreeing perfectly with one another in their action upon the heart and systemic capillaries, they differ extremely in their effects on the nervous tissue; ammonia being particularly distinguished from all inorganic compounds in this respect, and being very analogous to poisons derived from organic products, which it also resembles in its chemical properties.

The general conclusion which the author is led to draw from these researches is, that there exists a close relation between the chemical properties of the substances experimented upon, and their physiological effects; his experiments tending to prove, that, when introduced into the blood, substances which are isomorphous exert similar actions on the living tissues. He notices, however, two exceptions to this law; namely, the similarity of the actions exerted on the pulmonary tissue by the salts of lead with those of silver, although these salts are not isomorphous; and also the action on the nervous tissue of the salts of ammonia being different from that of the salts of potass. But he remarks that the oxide of lead bears a close analogy to the oxide of silver in its relation to organic compounds. The general fact previously announced by the author in his memoir read to the Academy of Sciences at Paris, namely, that salts with the same base have analogous actions, may be considered as a corollary of the above law.

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February 4, 1841.

Sir JOHN W. LUBBOCK, Bart., V.P. and Treas., in the Chair.

David Francis Atcherley, Esq., was balloted for and duly elected into the Society.

A paper was read, entitled, "On some Electro-Nitrogurets." By Wm. Robert Grove, Esq., M.A., F.R.S.

The author states that he has made many attempts to render permanent the ammoniacal amalgam, and that he has succeeded in freezing it by means of solid carbonic acid, during which solidification, and also while in its solid state, it underwent no chemical change. He subsequently attempted to procure a permanent compound by electrolyzing a solution of hydrochlorate of ammonia with an extremely fusible alloy at the cathode; but this attempt was unsuccessful. It then occurred to him, that by using an oxidable metal at the anode, which could be revived in conjunction with nascent hydrogen and nitrogen at the cathode, one or both of these elements might be combined with the solid metal, and so form permanent compounds.

The experiment made in this manner with the metals zinc, cadmium, and copper, was perfectly successful. A spongy mass col-

lected at the cathode, which floated upon the liquid, and which, when washed and dried, was analysed by heating in a tube retort; five grains of the zinc compound gave 0·73 of a cubic inch of permanent gas, which on examination proved to be nitrogen with one-fourth hydrogen. The same quantity of the cadmium compound gave 0·207 cubic inch of nitrogen with no admixture of hydrogen. A like weight of the copper compound gave 0·107 of nitrogen. No ammonia was evolved from either; and the author is inclined to think that the hydrogen yielded by the zinc compound resulted from the reaction of the metal upon combined water. The specific gravity of specimens of these substances which the author tried were respectively 4, 6, 4, 8, and 5, 9. A mixed solution of chloride of gold and hydrochlorate of ammonia, electrolyzed with platinum electrodes, gave a black powder of the specific gravity 10·3; five grains of which, being heated, gave only 0·05 cubic inch of gas. The author proceeds to observe, that the similarity in appearance and mode of formation of these compounds and of the mercurio-ammoniacal amalgam, is strong evidence of identity of constitution, and that the non-permanence of the latter substance is due to the mobility of the mercury; for if we place the compounds in similar circumstances, that is, solidify the mercurial one, or liquefy those of the other metals, the phenomena are perfectly analogous. The experiments also bear immediately upon those of Thénard, Savart, and others, where ammonia, passed over heated metals, was found to be decomposed more completely by the oxidable than by the inoxidable metals, and to alter their physical characters without materially increasing their weight. On examining papers connected with this subject, the author found that Mr. Daniell had cursorily noticed a deposit somewhat analogous to those here treated of, which was formed upon the negative plate of his constant battery when this was charged on the zinc side with hydrochlorate of ammonia, and the nature of which that gentleman observed was worthy of further examination, but had not had time to investigate.

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February 11, 1841.

The MARQUIS OF NORTHAMPTON, President, in the Chair.

The Right Hon. Sir Richard Hussey Vivian, Bart., G.C.B., &c., and Samuel Cartwright, Esq., were balloted for, and duly elected into the Society.

A paper was read, entitled, "Contributions to Terrestrial Magnetism, No. 2." By Major Edward Sabine, R.A., V.P.R.S.

This paper is the second of a series, in which the author purposes to communicate to the Royal Society the results of magnetic observations in different parts of the globe, having for their object to